Space Weather Forecast

Issued on Thursday, 14 September 2023 at 01:21 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Isolated Moderate-class flares likely (R1-R2 radio blackouts) for all days. Chance of G1/Minor storms on day 1 (14 Sep).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with only Common-class flares observed in the past 24 hours. The largest event was from a large sunspot region in the northwest of the disc. There are currently eight sunspot regions on the visible disc. The region in the northwest remains the largest spot on the disc, but has shown little development and remains magnetically rather simple, despite its moderately large size. There are a number of other regions on the disc which are showing some limited magnetic complexity, but these are all much smaller in size. No Earth directed Coronal Mass Ejections (CMEs) were observed during the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar parameters were indicative of the waning effects of a CME that arrived at Earth on 12 Sep, amidst a generally background solar wind regime. Solar winds have varied between slightly elevated and background levels, with a peak of 463km/s at 13/0428 UTC. The Magnetic Field carried by the solar wind started the period at Moderate levels. It has erratically reduced during the period back to predominantly Weak levels, but has recently increased back to Moderate again. The important north-south component was moderately southward to start the period. Short-lived weakly northward intervals have been observed, otherwise largely weakly southward direction has been recorded.

Geomagnetic activity was at G1/Minor storm levels at the start of the period, with a Kp5 interval observed 13/0001-0300 UTC. Thereafter activity was at Quiet to Unsettled levels (Kp1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Low with isolated Moderate flares likely and a slight chance of isolated Strong flares.

Solar Wind / Geomagnetic Activity: Two CMEs that left the sun on 11 Sep may give glancing blows at Earth between day 1 and 3 (14-16 Sep), however, any potential effects at Earth are expected to be small if they do arrive.

Earth is currently in a background solar wind regime. A number of high-speed stream influences from coronal holes are expected during the period, beginning on day 1 (14 Sep) onwards with speeds increasing to Slightly Elevated or Elevated levels initially, then perhaps to Strong levels by day 3 (16 Sep). Speeds then only slowly easing on day 4 (17 Sep), but likely still at Elevated levels.

Overall, largely Quiet to Unsettled (Kp2-3) geomagnetic activity is forecast, but with a chance of Active (Kp4) intervals and slight chance of G1/Minor Storm (Kp5) intervals, most likely on day 1 (14 Sep) with a diminishing, low or very low chance on subsequent days.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to persist at background with no solar radiation storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	20	10	10	5
Strong	G3	No	3	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	60	60
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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